June 22, 2004

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Carrier Current Systems, including	)	**ET Docket No. 03-104**
Broadband over Power Line Systems	)	
	)	
Amendment of Part 15 regarding new	)	
requirements and measurement guidelines	)	**ET Docket No. 04-37**
for Access Broadband over Power Line	)	
Systems	)	

Reply comments by Alan Erickson:

- In support of comment filed by Alan Erickson, document received/adopted 05/04/04 and available: http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516183260
- In support of the reply comment filed by Alan Erickson, document received/adopted 05/21/04 and available: http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516214274
- In support to reply comment filed by Scott D. Prather and Anne H. Prather, document received/adopted 6/21/2004 and available: http://gullfoss2.fcc.gov/prod/ecfs/retrieve.cgi?native_or_pdf=pdf&id_document=6516214387

To the Commission:

I seek to offer an opinion as explanation to the confusion existing among Broadband over Power Line (BPL) proponents and those in opposition. Basically, Part 15 and similar regulations were adopted prior to modulation techniques and methods as currently used in BPL. Further, the power limits of Part 15, as applied to unlicensed carrier current systems are irrelevant, as they do not, and were not intended to, by themselves, prevent interference to licensed users of the spectrum.

BPL has been described as related to a carrier current system. However there is a MAJOR difference. Carrier current systems are INTENDED to radiate and their emissions are desired to be received by sensitive narrow band receivers. Their power is limited, as is the power of a licensed user, in accordance with good engineering practice under the Commission's rules[1]. There is no reason to expect that the limits on power eliminate interference. They do not. This is noted in Part 15:
(c) Parties responsible for equipment compliance should note that the limits specified in this part will not prevent harmful interference under all circumstances[2]. (emphasis added)

[1] 47 C.F.R § 15.221 and as noted in the Commission's NPRM ET 04-37 footnote 3 and related text.
[2] 47 C.F R § 15.22115.15 General technical requirements

The principle factor in cooperative operation is that legacy carrier current systems operate with similar modulation and bandwidths as the licensed users in the frequency band of operation. The method of interference elimination is simply the use of frequency management. BPL systems, in contrast, operate in a different manner. Fundamentally, they do not use similar modulation as the licensed users in the frequency band of interest.

The "development of sophisticated modulation schemes[3]" and the ability to have these occupy the same spectrum as other users is a fundamental issue before the Commission. The Commission is in error by its current approach of not actively regulating the emitters frequency of operation, and allowing significant energy to be emitted under the current as well as the proposed rules over a large number of narrow band user's frequencies.

The significance of the sophisticated modulation schemes is lost on reading the definitions of modulation schemes in the rules. The descriptions of Emissions, modulation, and transmission characteristics[4] identifies in great detail modulation of a single carrier. It also describes bandwidth limitations (occupied and necessary bandwidth). This is a good description of narrow band communications techniques (or wideband within a necessary bandwidth). It very poorly describes techniques using multiple carriers, such as Orthogonal Frequency Domain Multiplexing (OFDM) or other wideband techniques.

OFDM is one modulation type used in BPL. It consists of a large number of carriers spread over a wide spectrum. As such, it provides the potential of simultaneously interfering with a large number of narrow band users of that same spectrum.

There are other types of broadband modulation. One type is that uses in Ultra Broadband (UWB). There is interesting analogies in the Commissions proceedings, where it is stated, "Second, the current emission measurement procedures specified in our Part 15 rules were developed for relatively narrowband systems and pose unnecessary restrictions to, UWB technology, particularly impulse systems.[5]"

In the case of the MF and HF spectrum, these restrictions are hardly "unnecessary" where the primary usage is narrowband. This is indicative of the incompatibility of narrowband and wideband techniques, as pointed out in the same proceedings, "Part 15 intentional radiators generally are not permitted to operate in certain sensitive…bands… employed by radio services that must function, as a nature of their operation, using extremely low received signal levels.[6]" Amateur Radio stations operate, by their nature, with extremely low received signal levels in order to achieve the desired communications range with acceptable power levels.

Another type of broadband modulation is older than the Communications Act of 1934, is sometimes called "spark", but is referred to in the commission's rules as "Type B

[3] the Commission's NPRM ET 04-37 page 3, paragraph 2.
[4] 47 C.F.R 2.201
[5] ET 98-153 paragragh 8, page 5
[6] ET 98-152, paragraph 6 and footnote 3, page 5

emissions, or damped waves[7]" . This modulation is expressly prohibited for BPL under Part 15.

(d) Intentional radiators that produce Class B emissions (damped wave) are prohibited[8].

What is the characteristic that outlawed spark? It was simply that it occupied significant bandwidth and interfered with a large number of narrowband users.

What is the difference between using OFDM, UWB or Class B emissions in the MF and HF range? The author sees very little difference. These modulation techniques all remove the ability to perform frequency management to eliminate interference with incumbent narrow band users. All of these techniques have the ability for a single system to interfere with a large number of other users. All should be banned from use under Part 15.

Removing the ability for adequate frequency management techniques leaves only the power levels as a mitigation of eliminating interference. As was pointed out earlier, the levels allowed under Part 15 for carrier current systems DO NOT provide protection for narrow band systems.

The "protection" under Part 15 comes from:
"(b) Operation of an intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused…[9]"

As evidence of the lack of protection under the current situation, please see the author's reply posting noted on the cover sheet. Further, it is noted that the incumbent narrow band users are licensed to use the spectrum in question in the MF and HF regions. There is absolutely no right implied by anybody to intentionally or unintentionally use this spectrum. The reply comment by Prather, noted on the cover sheet, is also in strong opposition to any implied rights of BPL proponents.

I implore the Commission to proceed with great caution with BPL. The modulation is not compatible with existing incumbent users. The power levels do not provide protection from existing users.

Alan R Erickson, WB0OAV
6722 Kent Dr NE
Cedar Rapids IA 52402

[7] 47 C.F.R 2.201 (f)
[8] 47 C.F R § 15.5 General Conditions of Operation
[9] 47 C.F R § 15.5 General Conditions of Operation